



AIS Interference Discussion

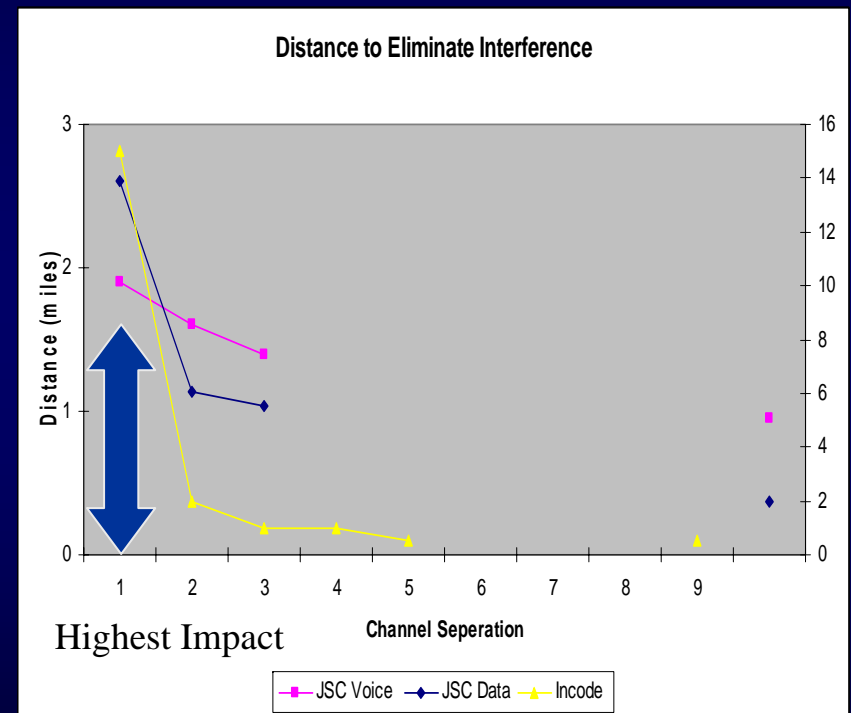
FCC WTB Meeting
March 30, 2005

- Agreement on Simplex AIS Interference
- Interference Impact
- MariTEL's Situation
- Solutions

Simplex AIS Interference

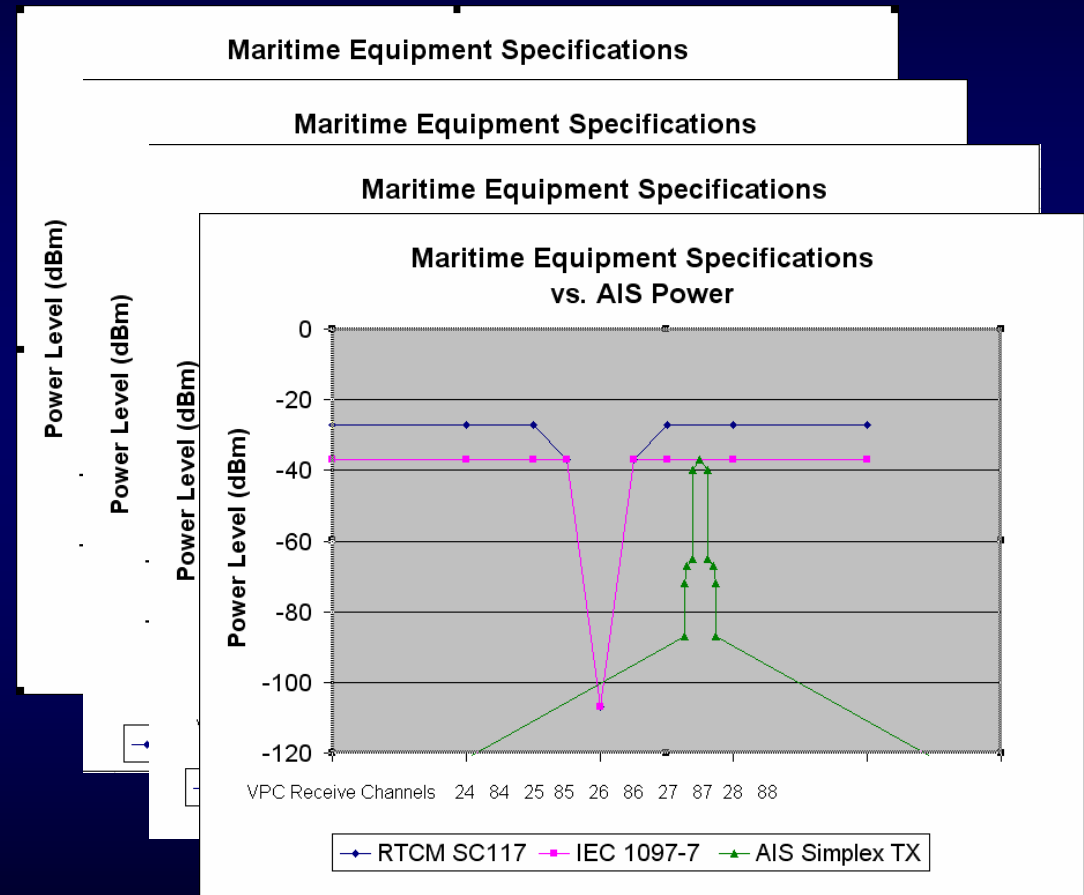
- Record show agreement on AIS interference characteristics.
 - Degree of impact based on geographic and spectral proximity
 - Other countries mitigate this interference by establishing guard bands around AIS channels.
- The only question is whether it is feasible for VPC spectrum users to overcome this level of interference.

* - Multi Transmitter Environment



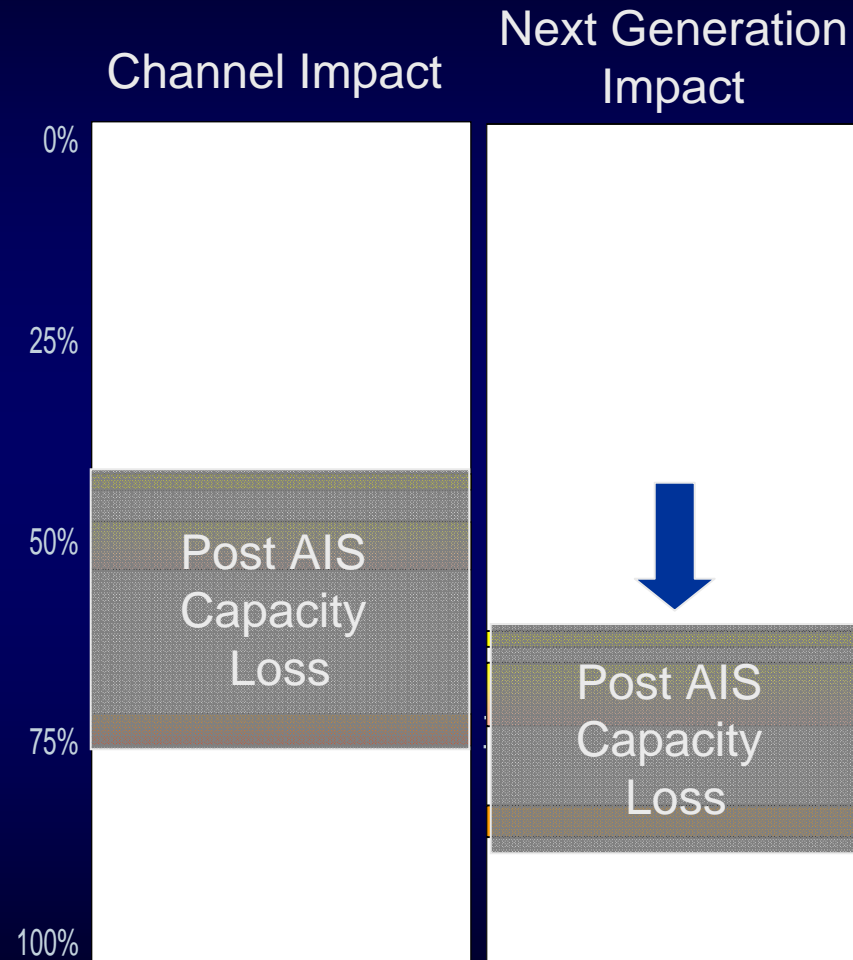
Interference Impact: Installed VHF Equipment

- International ship-board installation guidelines are not sufficient for domestic AIS carriage.
 - IEC 1097-7 - the current test specification for maritime equipment.
 - SC117 – RTCM recommendation for harsh maritime environments.
 - International installation guidelines may not protect the installed base of VHF equipment.
- AIS NPRM contemplates installations which may permanently damage installed VHF equipment.
- New domestic ship-board installation guidelines must be stringent and enforced.

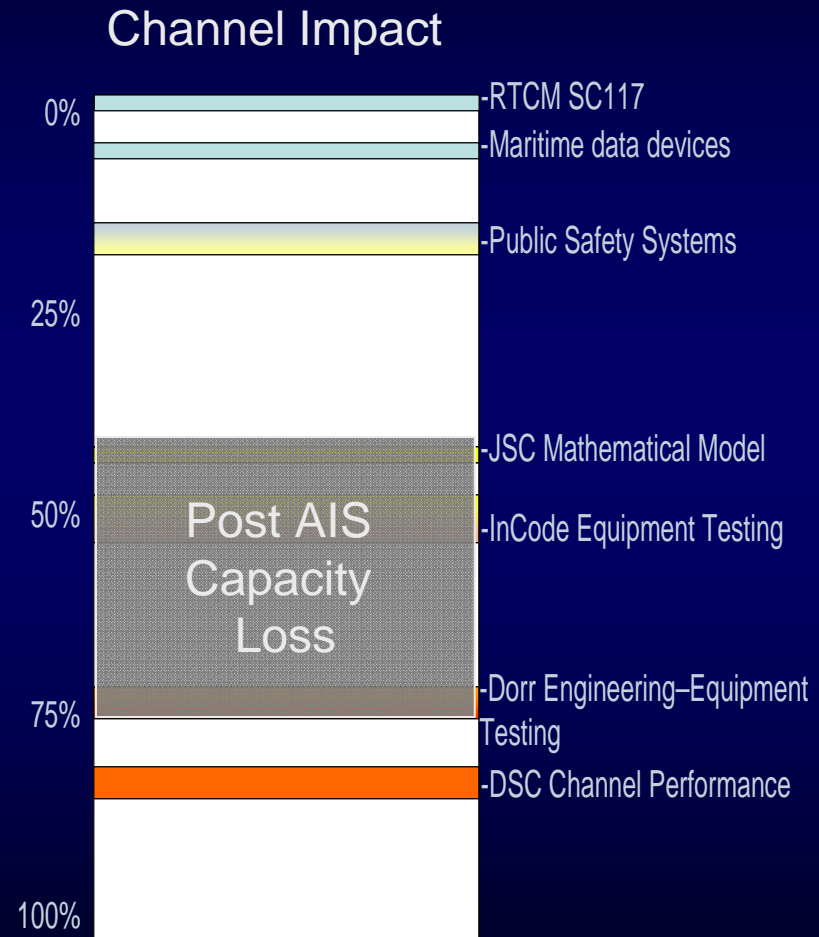


Note: Power levels are for illustration.

- Simplex AIS Interference causes capacity loss.
 - JSC theoretical modeling including RS (31,19) 16 level FEC, block interleaving, and now erasure technology causes ~40% reduction.
 - inCode equipment testing with type accepted available equipment - ~50% reduction plus system instability.
 - Dorr Engineering equipment testing including RS (31,19) 16 level FEC and block interleaving.
- FEC / Interleaving have significantly more Impact on next generation technologies.

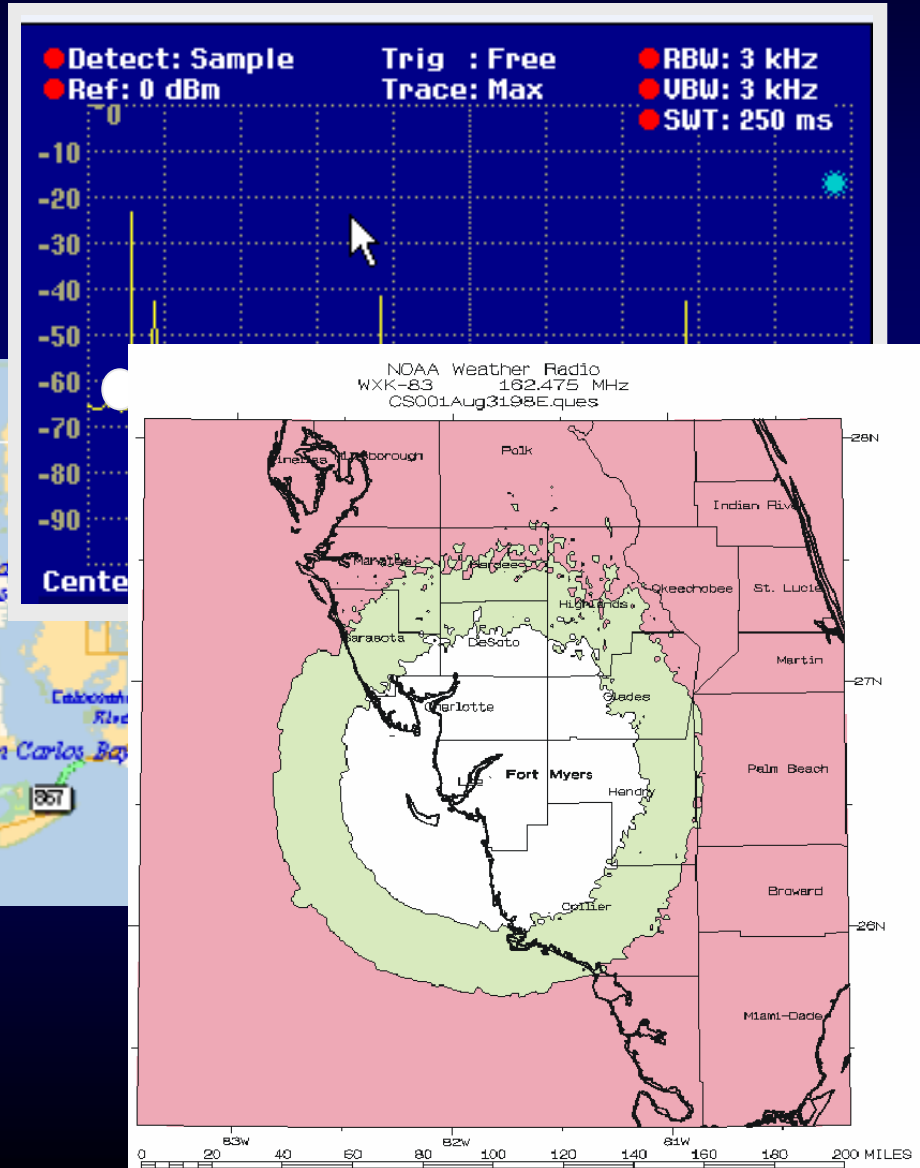
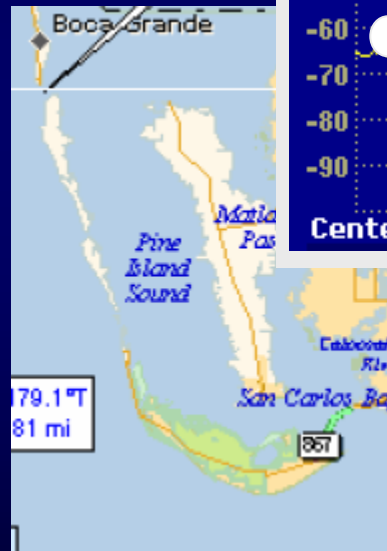


- Compared with currently available maritime data devices and even Public Safety systems, the impact from AIS is excessive.
- This underscores why FEC / Block Interleaving (with or without Erasure) is not an effective solution.
- The NTIA's example of DSC technology's ability to repeat messages 5 times – 80% reduction of channel capacity - is obviously not a realistic solution.

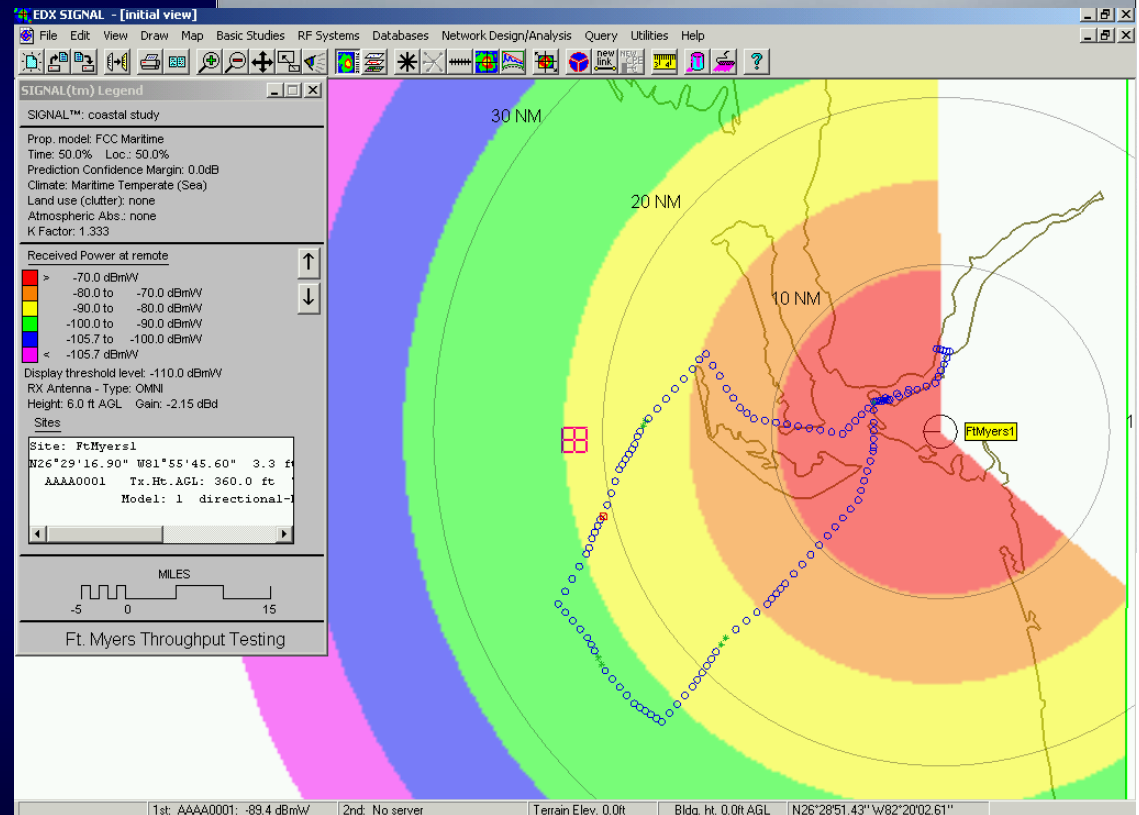


Test RF Environment

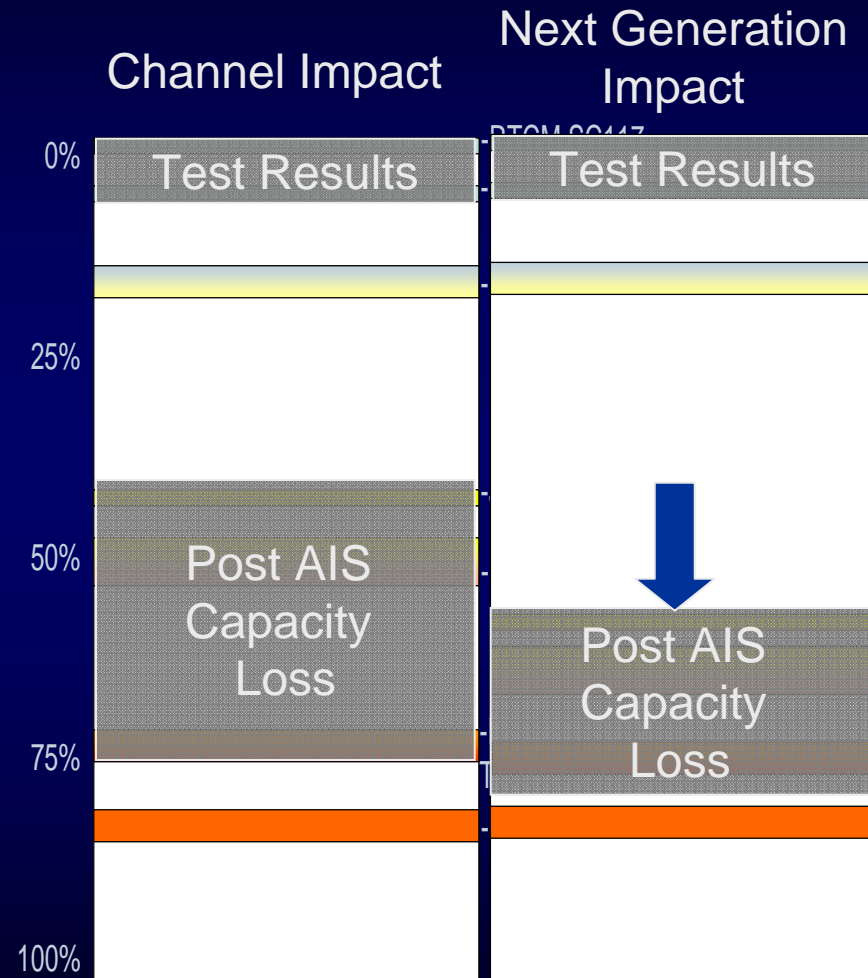
- Testing in Fort Myers, FL.
- Significant sources of Interference in test area.
- NOAA Weather "directly covers" the test area.



- Testing shows that maritime data systems can operate minimally 25 NM from the site without FEC and Block Interleaving.
- The manufacturer believes, based on RF propagation models, that 30 NM is easily achievable without significant system degradation.
- Result is that current Non-FEC equipment configurations operate adequately over the vast majority of VPC required coverage areas.
- Light FEC/Block interleaving could be selectively used to further expand the range of cell sites, but is not required.



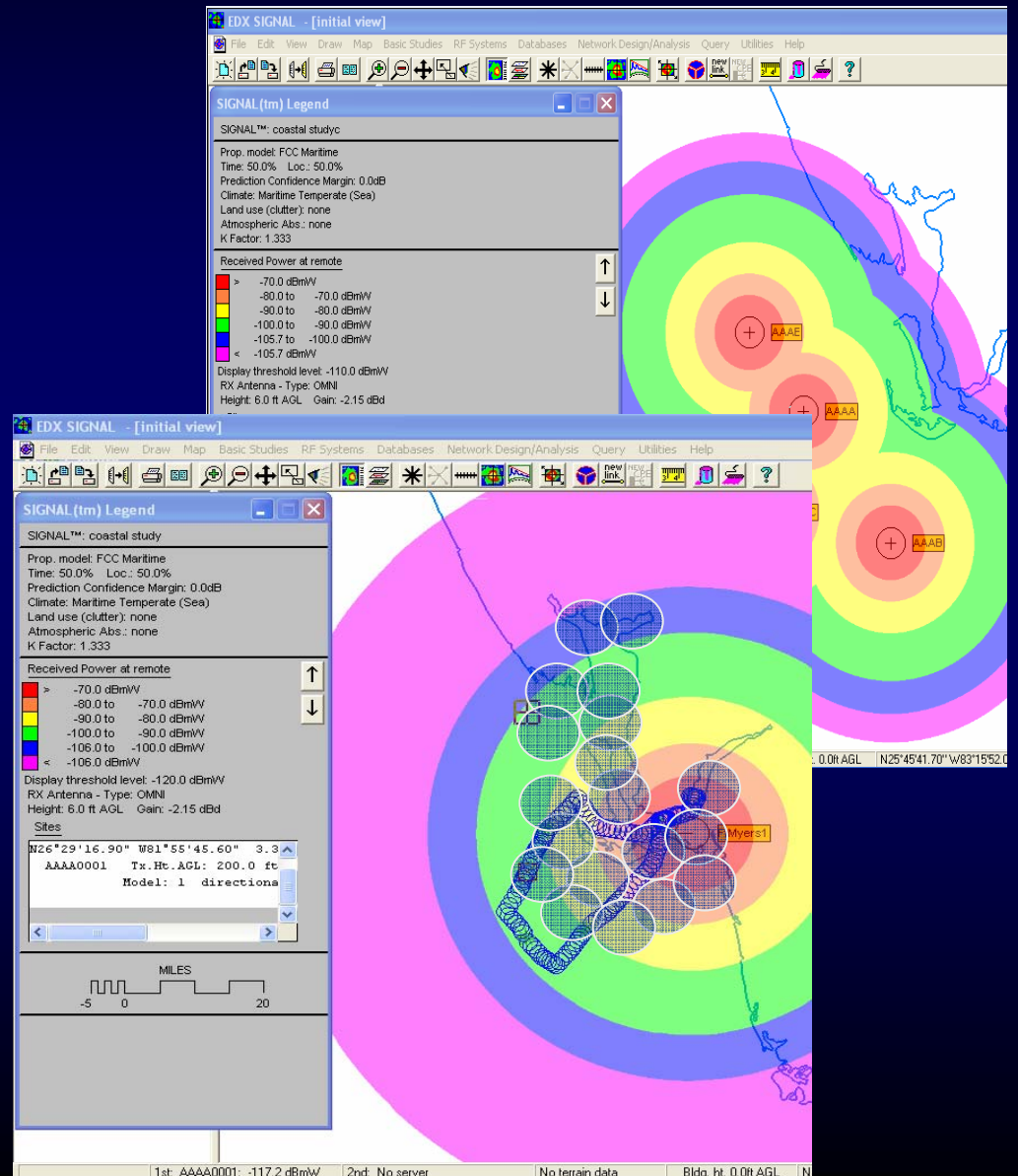
- Test results show that MariTEL can operate today with existing Part 90 data equipment with negligible channel impact.
- Post AIS channel impact is minimally 40-50%.
- AIS therefore imposes a minimal 40-50% channel tax on VPC data operations.



- Manufacturers will not guarantee existing equipment VPC channel performance in the presence of AIS interference.
 - Best analysis: One public safety product may work on ~50% of VPC channels.
 - Worst analysis: Products will not satisfactorily operate on any VPC channel without development of a “maritime centric” data device specifically to mitigate AIS interference.
- Erasure technology, JSC/NTIA’s secret “mathematical sauce”, has not been found in any applicable equipment.
- Equipment manufacturers have determined the JSC/NTIA solution of FEC and block interleaving is “not the right solution for this problem”.
- Considering the substantial investment in technology required, equipment manufacturers are hesitant to begin development pending the Commission’s final rules and a fully defined business case.
- Any meaningful technical solution requires development.

Impact of Simplex vs. Duplex Channel Inside 12 NM

- The top chart shows the RF interference impact from vessels ~12 NM from the shoreline.
 - While minimally impacting, interference from these vessels to operations along the shoreline is manageable. Signal levels are predicted to be generally less than -90 dBm with widely disbursed vessels.
- The bottom slide shows the impact from simplex channel use from every vessel equipped with an AIS transponder.
 - A circle represents the field of interference from one simplex transponder.
 - General levels of interference in port areas is expected to regularly exceed -80 dBm with a high concentration of AIS vessels.
- The cumulative effect of simplex use inside the 12 NM line is significantly more impacting vs. vessels switching to duplex channels.



MariTEL's Situation

- MariTEL has developed a marine data solution, using approved equipment.
 - Currently selecting strategic partners for product distribution.
 - A few months from launch.
 - Leverages existing assets for quick launch capability.
- However, the performance of that same system, after AIS deployment as contemplated by the NPRM, is commercially unacceptable.
- MariTEL has found no available equipment with guaranteed performance, post AIS deployment.
- To meet business opportunities and buildout obligations, MariTEL must deploy available equipment with confidence that the Commission's AIS NPRM ruling will not undermine investment.



- Authorization for channel 87B, but only contingent upon:
 - Demonstration, reasonably acceptable to MariTEL, that the use of AIS technology will not create more interference to VPC operations than exists in today's maritime environment, or
 - Demonstration, reasonably acceptable to MariTEL, that equipment and technology is available today at market prices that overcomes interference and capacity loss concerns.
- The FCC cannot simply state it will address interference in the future, when the interference is known today.
- MariTEL should be free to pursue business opportunities with confidence that the AIS NPRM ruling will not undermine its business plans.